

Claims:

The embodiments of the invention in which an exclusive property or privilege is claimed are, therefore, defined as follows:

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1. A method of cleaning fabrics comprising: providing a wash chamber for receiving a substantially non-reactive, non-aqueous, non-oleophilic, apolar working fluid and the fabrics to be cleaned, and at least one washing adjuvant, and wherein the wash chamber is rotated in one direction for a period of time and is then rotated in the opposite direction for a period of time to complete an agitation cycle; removing said working fluid from the fabric in said washing chamber; repeating the agitation cycle and the removal of said working fluid; and providing a stream of air through the wash chamber to substantially remove remaining working fluid from the fabric.

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2. The method of claim 1 wherein said non-reactive, non-aqueous, non-oleophilic, apolar working fluid under standard conditions is further characterized by: a KB value less than approximately 30; a surface tension less than approximately 35 dynes/cm²; and a solubility in water less than 10%.

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3. The method of claim 1 wherein the washing adjuvant is selected from the group consisting of: builders, surfactants, enzymes, bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pro-perfumes, finishing aids, lime soap dispersants, composition malodor control agents, odor neutralizers, polymeric dye transfer inhibiting agents, crystal growth inhibitors, photobleaches, heavy

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metal ion sequestrants, anti-tarnishing agents, anti-microbial agents, anti-oxidants, linkers, anti-redeposition agents, electrolytes, pH modifiers, thickeners, abrasives, divalent or trivalent ions, metal ion salts, enzyme stabilizers, corrosion inhibitors, diamines or polyamines or alkoxylates, suds stabilizing polymers, solvents, process aids, fabric softening agents, optical brighteners, hydrotropes, water, suds or foam suppressors, suds or foam boosters, fabric softeners, antistatic agents, dye fixatives, dye abrasion inhibitors, anti-crocking agents, wrinkle reduction agents, wrinkle resistance agents, soil release polymers, soil repellency agents, sunscreen agents, anti-fade agents and mixtures thereof.

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4. The method of claim 3 wherein a preferred surfactant for the systems will have a hydrophilic-lipophilic balance from approximately 3 to 14.
5. The method of claim 1 including the step of reversing the direction of rotation in a manner which will change the surface of the fabric exposed to the air stream.
6. The method of claim 1 wherein the air stream passing through the wash chamber is induced by a blower on the downstream side of the washing chamber and which is constructed and arranged to decrease the absolute pressure in the chamber, and whereby the ratio of the vapor pressure to the total pressure is increased.
7. The method of claim 1 including the step of: passing said working fluid through filter means of the type described in paragraph 82 of the specification.

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8. The method of claim 7 including the step of cooling the removed working fluid to a degree which solidifies the water present to facilitate its removal by the filter means.
9. The method of claim 7 providing a further cycle wherein the working fluid is cooled prior to passing through the filter.
10. The method of claim 1 including the step of: passing said working fluid through filter means of the specified type in paragraph 79 of the specification.
11. The method of claim 10 including the step of cooling the working fluid prior to passing through said last mentioned filter means to a degree which solidifies the water present to facilitate its removal by the filter means.
12. The method of claim 10 providing a final cycle after the step wherein the working fluid is cooled prior to passing to the filter and in which the cooling step is avoided.
13. The method of claim 1 wherein the air stream is heated and controlled so that said working fluid does not see temperatures exceeding 30°F below the flash point.
14. The method of recovering working fluid from a wash liquor by sequentially performing the following treatments: treating the wash liquor either with carbon dioxide under pressure, performing temperature reduction, contacting it with a flocculating agent, adjusting its pH or contacting it with an ion exchange resin; and treating the effluent from the above step by means of one of the following materials: a dissolver, an emulsifiers, an adsorption agent, an absorption agent, a soap, a pH shifter, a flocculating agent, a filtration material, a cake/drying

material agent, by gravimetric means, by vortex separation, by distillation , by freeze distillation; treating the effluent from the above step with one of the following a coalescence agent, an absorption agent, an adsorption agent, a pH adjustment agent, an ion exchange resin; and treating the effluent from the above step by means of one of the following carbon dioxide under pressure, a flocculating agent, a pH adjuster, performing temperature reduction, an adsorption agent, an absorption agent, an ion exchange resin.

15. The method of claim 14 wherein said non-reactive, non-aqueous, non-oleophilic, apolar working fluid under standard conditions is further characterized by: a KB value less than approximately 30; a surface tension less than approximately 35 dynes/cm²; and a solubility in water less than 10%.

16. The method of claim 14 including the step of reducing the temperature prior to contacting the wash liquor with any of said material groups.

17. The method of claim 14 including the step of treating the wash liquor by electric coalescence of at least one of the materials.

18. The method of claim 14 wherein said filter/adsorption/absorption agents are treated by an anti-fouling chemical producing a phase change of the water to form ice crystals and catching the crystals by means of a filtering step.

19. The method of recovering working fluid from a wash liquor by sequentially performing the following treatments: treating the wash liquor either with carbon dioxide under pressure, performing temperature reduction, contacting it with a flocculating agent, adjusting its pH or

contacting it with an ion exchange resin; treating the effluent from the above step with one of
5 the following: a coalescence agent, an absorption agent, an adsorption agent, a pH adjustment
agent, an ion exchange resin; then treating the effluent from the above step by means of one
of the following materials: a dissolver, an emulsifiers, an adsorption agent, an absorption
agent, a soap, a pH shifter, a flocculating agent, a filtration material, a cake/drying material
agent, by gravimetric means, by vortex separation, by distillation , by freeze distillation; and
10 then treating the effluent by means of one of the following carbon dioxide under pressure, a
flocculating agent, a pH adjuster, temperature reduction, an adsorption agent, an absorption
agent, an ion exchange resin.

20. The method of claim 19 wherein the working fluid is a non-reactive, non-aqueous, non-
oleophilic, apolar working fluid and under standard conditions is further characterized by: a
KB value less than approximately 30; a surface tension less than approximately 35
dynes/cm²; and a solubility in water less than 10%.

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21. The method of claim 19 including the step of initially reducing the temperature of the wash
liquor prior to its contact with any of said material groups.